In the Claims

1. (Currently amended) Apparatus for detecting charged particles, the apparatus comprising a chamber for receiving said particles and being such that, in use, at least a partial vacuum is maintained in the chamber; an impact responsive sensor for detecting particles incident thereon, at least the part of the sensor on which the particles are incident being situated in the chamber; accelerating means for providing, in the chamber, an electric field for accelerating charged particles therein towards the sensor and electrically conductive barrier means sealing an inlet to the chamber to allow said partial vacuum to be maintained, the barrier means being sufficiently thin to enable the charged particles to be detected to travel therethrough, and being electrically isolated from the accelerating ~~electrode~~ means so as to be capable of being maintained at a different potential from the latter.

2. (Original) Apparatus according to claim 1, in which the accelerating means comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage.

3. (Currently amended) Apparatus according to claim 1 ~~or claim 2~~, in which the sensor comprises a scintillator for emitting light in response to the impact of a charged particle therewith.

4. (Currently amended) Apparatus according to claim 3, in which the accelerating means comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage, and in which the scintillator incorporates said electrically conductive member.

5. (Currently amended) Apparatus according to claim 4, in which the sensor comprises an ~~Everhard Thornley~~ Everhart-Thornley detector.

6. (Currently amended) Apparatus according to claim 1, in which the barrier means ~~conveniently~~ comprises a membrane of metallic foil.

7. (Original) Apparatus according to claim 6, in which the foil is of aluminium.

8. (Original) Apparatus according to claim 7, in which the aluminium foil is of a thickness of 7.5nm.

9. (Currently amended) Apparatus according to ~~any of claims 6 to 8~~ claim 6, in which the barrier means further comprises support means which extends across said inlet behind the foil to support the latter against pressure exerted on the membrane by gas outside the chamber.

10. (Currently amended) Apparatus according to ~~any of the preceeding claims~~ claim 1, in which the apparatus further includes an electrically conductive cage mounted in front of, but electrically insulated from, the barrier means, the cage being connectable to an accelerating voltage for drawing particles towards the barrier means, the cage being so constructed as to allow the passage of particles therethrough.

11. (Currently amended) Apparatus according to ~~any of the preceeding claims~~ claim 1, in which the apparatus includes a pump connected to, and operable to evacuate, the chamber.

12. (Original) Apparatus according to claim 2, in which the apparatus includes voltage application means for applying a first accelerating voltage to said electrically conductive member and a second accelerating voltage of the same polarity as, but lower than, the first accelerating voltage, to the barrier means.

13. (Currently amended) Apparatus according to claim 12, in which the apparatus further includes an electrically conductive cage mounted in front of, but electrically insulated from, the barrier means, the cage being connectable to an accelerating voltage for drawing particles towards the barrier means, the cage being so constructed as to allow the passage of particles therethrough, and in which the voltage application means is also operable to apply to the cage a further voltage, of the same polarity as, but lower than, the second voltage.

14. (Original) Apparatus according to claim 10, in which the cage is part-spherical or ellipsoidal.

15. (Currently amended) A scanning electron microscope having a sample chamber for holding a sample to be imaged in a gaseous environment, generating means for generating a scanning beam of electrons and directing said beam onto a sample in said sample chamber, wherein said chamber also contains detecting means for detecting secondary electrons emitted by the sample, said detecting means comprising apparatus according to claim 1 ~~any of claims 1 to 14~~.

16. (Currently amended) A microscope according to claim 15, in which the accelerating means comprises an electrically conductive member situated on or adjacent to the sensor, and a connector for connecting said member to an accelerating voltage, wherein the electrically conductive member and barrier means are connected to a voltage application means for applying a voltage of +10 kV to the member and of 0 to +1 kV to the barrier means.

17. (new) A method of detecting charged particles in a gaseous environment, the method comprising the steps of allowing or causing said particles to pass through an electrically conductive barrier means at the inlet to a chamber in which at least part of an impact responsive sensor is situated; accelerating particles in the chamber towards the sensor, by means of an electric field in the chamber, while maintaining

the chamber at a lower pressure than said environment and maintaining the barrier means of a potential that at least reduces the intensity of electric field passing through the barrier means and into the environment, wherein the barrier means allows the passage of said particles whilst enabling the lower pressure to be maintained in the chamber.

18. (new) A method according to claim 17, wherein the step of maintaining a lower pressure in the chamber is achieved by maintaining at least a partial vacuum in the chamber by means of a pump connected to an outlet of the chamber.

19. (new) A method according to claim 17, further comprising the step of maintaining the barrier means at a different potential from that of accelerating means, for creating said electric field in the chamber.